



TRICHLOROETHYLENE (TCE) GROUNDWATER CONTAMINATION INVESTIGATION Eastern Lisle and Nearby Affected Areas

FACT SHEET #1
October 2001

EPA Region 5 Records Ctr.



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BACKGROUND:

During the late summer and early fall of 2000, a number of residents with private wells in an eastern Lisle neighborhood south of Ogden Avenue (**Area A** on enclosed Map) had their wells sampled by a private environmental contractor. By mid-November, more than 35 residential wells had been sampled by various parties. **Trichloroethylene (TCE)** had been detected in at least 20 wells, and it had been found in excess of the U.S. Environmental Protection Agency (U.S. EPA) Drinking Water Standard for public water supplies (5 parts per billion) in six wells. The concentrations ranged from just above the detection limit to almost 20 parts per billion in one well.

The Illinois Environmental Protection Agency (IEPA) had followed these developments closely since public concern began to increase at the end of that summer. IEPA obtained the lab results from the various parties sampling the wells, and in November 2000, mounted a major effort to sample the remaining wells in the affected neighborhood.

FACTS ABOUT TRICHLOROETHYLENE:

In response to numerous questions about TCE, IEPA, Illinois Department of Public Health, and the DuPage County Health

A CHANCE TO TALK:

Because of the considerable citizen interest and concern over the groundwater contamination problems described in this Fact Sheet, two all-day "Availability Sessions" are being planned for the Lisle area. At these open-house-style sessions, representatives from IEPA, The Attorney General's Office, The DuPage County State's Attorney's Office, The Illinois Department of Public Health, DuPage County's Health Department, and participating local municipal governments will be available to answer questions that local residents may have about the complex technical, health-related, logistical, and legal matters surrounding the groundwater contamination.

One Availability Session will be held for residents in and near **Area A** in Lisle, at the Lisle Public Library's Meeting Room, 777 Front Street, Lisle, on October 16, 2001. The session will begin at 10:00 A.M., break at noon for lunch, resume at 1:00 P.M., break again for dinner at 5:00, and resume at 6:00 P.M. and continue until all questions are answered or 9 P.M. (when the Library closes).

The second session will be held at the Woodridge Public Library, 3 Plaza Drive (630/964-7899), in Woodridge, conveniently located near both Woodridge Estates (**Area B**) and Suburban Estates (**Area C**), on October 17, 2001. The same schedule will be followed as for the first session.

Department developed a site-specific "Question & Answer" document, which is enclosed. An additional resource is a TCE Fact Sheet developed by the federal Agency for Toxic Substances and Disease Registry (ATSDR), a division of the U.S. Department of Health & Human Services. It is available on the Internet, at:

<http://www.atsdr.cdc.gov/tfacts19.html>

Those without Internet access can request a copy from the IEPA staff member listed at the end of this document.

Another information source is the DuPage County Health Department website:

<http://www.dupagehealth.org>

DECEMBER 2000 SAMPLING:

With the assistance of the Village of Lisle's Public Works Department, IEPA staff developed lists of homes on private wells in the area where TCE had been found. The IEPA then contacted a number of homes close to those already known to have TCE in their wells, to get the information needed to do further sampling. IEPA's initial sampling round took place in the week before Christmas, 2000, in sub-freezing temperatures. Based on the results seen from the earlier sampling, IEPA field staff sampled 48 residential wells, most in **Area A** on enclosed Map, during three days of sampling.

The results were received from IEPA's contract lab on January 2, 2001, and very closely matched the earlier samples of homes in the area: 34 of the homes (over 70% of those tested) had detectable TCE concentrations, and nine of these homes had levels exceeding the federal drinking water standard.

At that point, more than 80 private wells had been sampled by various parties, and TCE had been detected in more than 54 of them.

Of those homes, 15 had TCE levels higher than those allowed for public water supplies.

Another important characteristic was noted in the results of all the wells with TCE contamination: IEPA samples contained no detectable amounts of the usual chemical "breakdown products" that very often occur when TCE is found in groundwater. These breakdown products often result from the action of naturally occurring bacteria in the soil and groundwater, which can use the TCE as an energy-source, in the process stripping off chlorine atoms to form new compounds, including several forms of **dichloroethylene (DCE)** and a chemical called **vinyl chloride**.

IEPA staff considered the absence of detectable DCE and vinyl chloride in all the samples from **Area A** as evidence that the TCE might have reached the bedrock without first spending a long time in contact with soils that contained "TCE-eating" bacteria. This was good news, in a way, since vinyl chloride is a known cancer-causing agent in humans. Health authorities are very concerned any time vinyl chloride is detected in water supplies used by people. In addition to being good news from a health standpoint, the absence of TCE's breakdown products in **Area A** well samples served as an "identifier" for the eastern Lisle groundwater plume.

All of the affected wells are thought to be drawing groundwater from the limestone bedrock formation, which is believed to be flowing in a generally southerly direction, and all of the affected homes found at that time were in **Area A**. In keeping with standard IEPA practice, each home sampled, including those sampled by the private consultant, received a letter from the toxicologists of the Illinois Department of Public Health (IDPH) explaining the implications of the results, as well as a copy of the lab results for their records. Those with further questions or concerns were provided with the name and phone number of a toxicologist at IDPH.

THE ATTORNEY GENERAL:

In January 2001, the IEPA referred the matter to the Office of the Illinois Attorney General, based on a demonstrated threat of TCE contamination in the drinking water of the sampled residential area in eastern Lisle.

Meetings between the Office of the Attorney General and the potentially responsible parties resulted in an Agreed Preliminary Injunction Order (Order) being filed in DuPage County Circuit Court on January 22, 2001. The Order required the provision of a safe drinking water source (bottled water) for all residences served by private wells in the area where affected wells had been found, with the "affected area" including a precautionary "buffer zone" to assure that small variations in flow of the contaminated water would not affect the wells of anyone not receiving bottled water. Again, this is identified as **Area A** on the Map.

On January 19, 2001, the Illinois Attorney General had a letter delivered to all 119 homes served by wells in **Area A**, informing the residents about the TCE found in area wells and recommending that they cease drinking the well water and begin using bottled water for drinking and cooking. Residents were told that a plan would shortly be developed under which potentially responsible parties (PRP's) would provide safe drinking water to the homes with wells in the area, and reimburse them for their bottled water costs in the interim. Residents with questions or concerns were provided with the name and phone number of a contact at IEPA for more information.

Residents in the area were then informed that they could contact a local drinking-water supplier to begin receiving regular home-deliveries of bottled water, at no expense to them. Those who had previously established a relationship with a different drinking water supplier could continue that

contract and forward their bills for reimbursement.

The January 22 Order also required an expedited environmental investigation. PRP's must submit all work plans to the IEPA and the Attorney General for approval. Among other things, this investigation requires the installation of a series of monitoring wells, designed to detect whether the groundwater in the soil and the bedrock beneath is contaminated. The fieldwork portion of this investigation began in March and is ongoing.

JANUARY: PRIVATE-WELL SAMPLING CONTINUES

The next priority was to identify all private wells that might be affected or threatened by any TCE contamination traveling beyond **Area A**. In mid-January, IEPA contacted Citizens Utilities of DuPage County, which provides water to the area directly south of **Area A**, and obtained information on which homes were served by public water in that area. The information showed that all the homes between **Area A** and Maple Avenue were served by the public utility, but immediately south of Maple, one neighborhood, "Lisle Farms," was on private wells.

This neighborhood, bordered on the east and south by the Meadows Subdivision (which is served by Citizens public water supply), began with homes on the east side of Kingston Avenue and continued west to the west side of Lenox Road, and was bounded on the south by South Road. All the homes in this area, with some exceptions on Maple, were believed to have private wells. In mid-January, 2001, IEPA began planning to sample a number of wells along the "northern tier" of those homes, just south of Maple (reasoning they would have been the first to be affected if TCE had traveled in that direction), to discover whether TCE was present in any of the wells.

On January 23, and again during the last week of January, IEPA sampled a total of 27 wells in this neighborhood. **Not a single well showed any trace of TCE**, nor any of the 33 other "volatile organic compounds" that would be detected by IEPA's analysis, which has a detection limit of one half of a part per billion. **IEPA concluded that the Lisle Farms neighborhood was not affected by the TCE contamination that had been found flowing south through Area A.**

NEW AFFECTED AREA

One private well included in the January 23rd sampling group was far to the southeast of the Lisle Farms area described above, but it had been sampled because it provided the closest available private well east of the Lisle Farms area. This well, at the east end of Woodridge Estates, was the only one in this group to show any contamination. The results were lower than many in **Area A**, and once again, only TCE was observed, not any of its usual breakdown products.

In the last three days of January, IEPA contacted 20 homes in the northeastern part of Woodridge Estates, as far west as Essex Road, and arranged to sample their wells. The results came back from the lab on February 22, 2001. Of the twenty wells, including a re-sampling of the first well sampled in the area, nine wells showed detectable levels of TCE (above half a part per billion). None of the wells sampled had TCE levels above 1.5 parts per billion. Again, as in **Area A**, only TCE was found in these wells. None of the usual breakdown products, DCE or vinyl chloride, were detected.

All the affected wells in Woodridge Estates were east of the homes on Kingston Avenue, a pattern that has continued in later sampling. **No wells in Woodridge Estates on or west of Kingston have had any detectable TCE (see Map Area B).**

On February 23, the Attorney General once again delivered a letter, this time to the 54 homes in **Area B**, recommending that the residents cease drinking or cooking with the well water and informing them of their bottled-water options.

During the January sampling, IEPA also sampled 30 additional wells in and near **Area A**, most along the edges of the central area previously found to be contaminated with TCE. Only two of these new samples had detectable TCE, both at levels below one part per billion. This supported the earlier picture of the TCE plume being confined to an area east of Kingston Avenue and west of Westview Lane.

Only one TCE anomaly was found in this round of sampling; an apartment building on Front Street west of Kingston was found to have a low level of TCE in its well. In the expectation that the TCE could be a part of the **Area A** contamination, letters from the Office of the Attorney General informed the residents that they would be receiving bottled water, as with the other neighborhoods.

NO TCE FOUND NORTH OF OGDEN:

In addition to the January sampling in these neighborhoods, IEPA also sampled two areas north of Ogden Avenue, as a precaution. Seven wells were sampled on the south end of Ivanhoe Avenue. No TCE was detected, or any other volatile contaminants, in any of the wells.

Eleven wells on Chelsea and Kingston Avenues north of Ogden and one well on Ogden itself, were sampled. None of these wells showed any trace of TCE or other contaminants. **IEPA concluded that these areas were not affected by TCE contamination.**

A BROADER PLUME, ANOTHER NEIGHBORHOOD:

IEPA staff next contacted the Woodridge Public Services Department to determine whether all the homes south of Woodridge Estates were served by public water. The only nearby residential wells to the south were southeast of Woodridge Estates, in a neighborhood south of 63rd Street known as Suburban Estates (**Area C on the Map**).

Looking at the pattern of well contamination seen in **Area B**, IEPA staff reasoned that they were probably seeing the **western edge** of the plume in these wells. Since the homes immediately east of this area were all on public water, it was impossible to know without more sampling how wide the contaminant plume might be at 61st Street (nearly two miles south of **Area A**). However, there was a clue in the **concentrations** of TCE detected in the wells here -- the levels were only about one-tenth the concentrations found in **Area A**. Since the absence of breakdown products suggested that the TCE was **not** degrading into other chemicals and disappearing in that way, it appeared to be **spreading out, or diffusing** into a larger volume of water, thus producing the lower concentrations observed in **Area B** and **Area C**.

IEPA contacted 37 homes, most on the outer edges of Suburban Estates, and arranged to sample their wells. In the first week of March, these wells were sampled, along with 47 wells from other neighborhoods.

The test results, two weeks later showed that the plume was indeed much wider than it had appeared at the east end of Woodridge Estates. On Friday, March 23, IEPA learned that 25 of the 37 wells sampled in Suburban Estates contained detectable TCE, and once again **only TCE** was found -- no breakdown products. The highest concentrations found were just over one part per billion, and many of the wells contained TCE at levels just above the detection limit, but TCE was

found on all portions of the periphery of the subdivision: north, south, east, and west.

IEPA immediately notified affected residents of the results. On March 26, the Office of the Attorney General distributed letters to the 99 homes in **Area C** informing them of the contamination in area wells and recommending that they stop drinking the well water and call the established bottled water supplier to begin deliveries.

WEST OF KINGSTON NEAR MAIN STREET:

In the early-March sampling, IEPA also sampled nine wells in the area near St. Joseph's Creek, north of Ogden Avenue and west of Kingston and Chelsea (which had been sampled earlier). Again, no contaminants of any kind were detected in this area.

In this early-March sampling, IEPA also sampled all the wells it could access between Ogden and Hitchcock Avenues, west of Kingston and east of Lincoln Avenue (Highway 53). Twenty-five wells were sampled in that area, and **no TCE was detected in any well in this area**.

There were, however, anomalous findings in five wells south of the railroad line, all but one within a block of Main Street. Four wells contained low levels (all less than 1.4 parts per billion) of **tetrachloroethylene** (Also called perchloroethylene, **PCE**, or "Perc"). Also, in one well west of Main Street near the railroad tracks, IEPA detected vinyl chloride, at levels just above the detection limit of half a part per billion. IEPA staff believe these results may be related to each other, and to the January finding of TCE in the one well on Front Street near Main (that well has since been replaced by a public water supply hookup).

PCE is a commonly used solvent that is often found in groundwater contamination incidents. When it is released into soil near the surface it often is exposed to soil

bacteria that begin the natural breakdown process described earlier with respect to TCE. While that process does not appear to have been at work on the TCE plume east of Kingston Avenue, the process **may** be going on near Main Street.

The "natural degradation" process can begin with PCE, then produce TCE, then several forms of Dichloroethylene, and can finally produce Vinyl Chloride. The finding of these low levels of these related compounds sporadically distributed in wells in a relatively small area leads IEPA investigators to look for a possible nearby source of PCE that might have been released to the soil and groundwater near the ground surface.

Most importantly, these findings do **not** appear to point to any connection to the previously identified TCE plume. Only the smallest traces of PCE have been found in any of the well samples taken east of Kingston. IEPA staff believe that the samples found near Main Street point to a **separate source(s)**, which is closer to the private wells where it has been found. IEPA plans additional investigation to seek the source(s) of the PCE.

In the meantime, the toxicologists at the IDPH have stated that the levels of PCE detected in the four wells do **not** constitute a significant health concern. The wells will be re-sampled over time to assure that levels do not increase, as IEPA looks for the source(s).

The one well with vinyl chloride again had levels below the federal drinking water standard of two parts per billion. However, because of the seriousness of long-term vinyl chloride exposure, it was good to find that the well, at a business office, was not used for drinking, cooking, or bathing.

RECENT SAMPLING: REFINING THE BOUNDARIES:

In May 2001 and again in early July and September, IEPA sampled more wells to refine the boundaries of the TCE contamination.

In Woodridge Estates, all wells between Kingston Avenue and Ridge Court (west of **Area B**) were sampled, again **with no wells showing detectable contamination on or west of Kingston Avenue**. In total, 23 Woodridge Estates wells west of Kingston Avenue were sampled, with none having detectable contamination. East of Kingston Avenue, of 53 wells tested (one resident could not be contacted), 40 wells had detectable levels of TCE (above half a part per billion), but none had levels above 1.5 parts per billion.

In Suburban Estates (**Area C**), the remaining 62 wells were sampled in the summer sampling rounds, and nearly two-thirds of the wells had detectable TCE levels. The highest TCE levels here were also about 1.5 parts per billion, and, once again, no other contaminants were detected.

During this summer period, in an effort to locate the eastern boundary of the TCE plume, IDPH and IEPA conducted selective sampling of wells in two areas east of the Tollway (I355). Twenty wells near the corner of Walnut Avenue and 59th Street were sampled, and nine wells had detectable TCE. Here the highest levels were about one part per billion.

As part of the same plume-tracing effort, IEPA sampled 18 wells east of the tollway and north of 53rd Street in Downers Grove. Of these wells, seven had detectable TCE, again at or below one part per billion. Again, no other contaminants were detected. IEPA will need to collect additional data to determine whether the TCE in these last two areas is associated with the same plume as the one being traced west of the Tollway, in **Area B** and **Area C**.

NEXT STEPS

IEPA will continue its investigation of the source of the TCE in **Areas A, B, and C.**

Later this fall, as a follow-up to previous sampling, IEPA will re-sample selected wells in the northern tier of homes in **Area A**, to determine whether there has been any change in the TCE concentrations as new groundwater has moved in from the north in the months since the wells were first sampled.

The IEPA will continue to monitor fieldwork being performed by Potentially Responsible Parties and evaluate results with respect to this groundwater investigation. Future Fact Sheets will cover new developments.

FOR MORE INFORMATION:

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QUESTIONS & ANSWERS ABOUT TRICHLOROETHYLENE

October 2001

Here are some answers to the common questions citizens have asked about the trichloroethylene problems recently discovered in and near Lisle, Illinois.

What is Trichloroethylene?

Trichloroethylene, also known as trichloroethene and TCE, is an industrial solvent. In its pure form, it is a colorless, nonflammable liquid at room temperature, with a somewhat sweet odor (similar to ether or chloroform) and a sweet, burning taste. At low concentrations in water (such as those present in the Lisle area) it has no detectable taste or odor. TCE does not occur naturally in the environment; it is always the result of manufacturing or of the breakdown of other manufactured solvents. TCE is mainly used as a solvent to remove grease from metal parts, though it has other uses.

What are the health effects of TCE exposure?

Exposure to levels of TCE **much greater** than those levels found in Lisle area wells can cause nausea, dizziness or headaches. Exposure to low levels over long periods may lead to impaired immune system function and may increase the risk of kidney or liver cancer or other damage. In recent years, the U. S. Environmental Protection Agency (U.S.EPA) has been conducting a full-scale re-evaluation of the health risks of TCE exposure, and a new Health Risk Assessment draft document is now in the comment stage.

What level of TCE in my household water supply is safe?

The U.S. EPA has set a level of 5 parts per billion of TCE in water as the maximum contaminant level (MCL) for public drinking water supplies. MCLs have been established by U.S. EPA to reduce the chances of adverse health effects from contaminated drinking water. MCLs do not have any regulatory force for private well supplies, but the Illinois Department of Public Health (IDPH) has been advising those with private well TCE concentrations in excess of 5 parts per billion to use an alternative water supply.

How can I reduce my exposure to the TCE in my well water?

The main way you can be exposed to TCE is by drinking water containing TCE. Drinking bottled water eliminates this exposure. Another option is installing a water treatment unit for your drinking water. Treatment systems should be ANSI (American National Standards Institute)-approved or NSF (National Sanitation Foundation)-certified under Standard 53 for the removal of TCE. Information on water treatment systems can be obtained from the Water Quality Association of Lisle, phone: 630/505-0160 (or Internet: www.wqa.org). One **caution** is in order: water treatment systems **require regular maintenance** in order to function effectively

and to avoid the growth of potentially harmful bacteria inside the system.

You might breathe some TCE vapors released from your water during showering, bathing, or other water uses. You can reduce your exposure by opening a window or running the bathroom exhaust fan during and after showering and bathing. Exposure to TCE evaporating from a dishwasher or washing machine should be very low. Again, a **whole-house** water treatment system can greatly reduce your exposure to TCE vapors.

TCE is a volatile chemical, meaning that it readily evaporates into the air. While this accounts for the risk from inhalation during some indoor water uses, it means that the **relatively low** TCE concentrations found so far in Lisle area wells should not present a significant risk in swimming pools and outdoor spas or hot-tubs. Over a relatively short time after filling or adding water the majority of the TCE should have escaped into the air and dispersed. Very little TCE is absorbed through the skin at the concentrations present in Lisle-area wells.

Vegetables would not be expected to take up TCE, so you can use your well water for gardening or lawn watering.

In the long run, converting to a **public water supply** is the surest and most permanent way to prevent future exposure.

Where can I get more health information about TCE?

The U.S. Agency for Toxic Substances and Disease Registry (ATSDR) has an excellent series of fact sheets on a wide range of chemicals, available on the Internet. The TCE Fact Sheet is available at: www.atsdr1.atsdr.cdc.gov:8080/ToxFAQ.html

Those without ready access to the Internet can request copies from the DuPage County Health Department or Illinois EPA.

I understand that all of the wells in Woodridge Estates and Suburban Estates have TCE levels at or less than 1.5 parts per billion (ppb). If homes in that area got public water supply hookups, couldn't that water contain as much as 5 parts per billion of TCE under federal regulations?

Public water supplies are all monitored regularly, not only for TCE but for numerous other chemicals as well. Federal regulations require public water supplies to inform their customers and to take action (such as adding purification processes, changing to a different source, etc.) if chemicals exceed the regulatory limits, known as **MCLs**.

Although the MCL for TCE is 5 parts per billion, it is **extremely unlikely** that water drawn from Lake Michigan would ever contain volatile organic compounds like TCE at levels even approaching the MCL. Such levels are typically found only in water drawn from underground sources (wells), where the volatile chemicals cannot evaporate into the air, as they can in surface waters. All the likely providers of public water for these two subdivisions would be distributing

water drawn from Lake Michigan.

If my home is served by a public water supply, is there any reason to be concerned that the TCE contamination travels under my property? What about the possibility of vapors coming up through the ground into my home?

Illinois EPA and its environmental contractors have analyzed this possibility using a “worst-case scenario” of the highest recorded concentrations of TCE in groundwater and the shallowest known contaminated groundwater (where the TCE would be closest to the surface). The predicted risk from **lifetime** exposure to any vapors traveling up through this expanse of soil (50 feet or more) was far below the “one-in-a-million” risk of cancer that is the usual comparison level for evaluating significance.

Will my water softener remove TCE?

Water softeners are not designed to remove chemicals like TCE from water supplies. Even so, when sampling for these chemicals, experts try to assure that samples are taken from locations where the water doesn’t pass through a softener, to obtain a sample that best represents the groundwater entering the home.

What makes the level of TCE vary from one well to another?

Many factors can influence concentrations of contaminants in well water:

- At any given time, some wells will be located closer to the highest concentrations of contaminants than others. That may be because they are closer to the original source or because they are closer to the center of the “plume” of contamination, where levels are higher than they are at the edges of the plume.
- Sometimes as groundwater moves through an area over time, a “slug” of water with the highest concentration of chemicals may move along with it, changing the concentrations significantly over weeks or months.
- Some wells are designed to draw water from a limited depth, and groundwater contamination in a given area may vary considerably by depth. In such a case, wells next door to one another could have quite different concentrations because of different depths.

Even so, it is most typical for near neighbors to have at least **similar** well results.

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